IN THE SPECIFICATION:

Please replace paragraph number **[0001]** with the following rewritten paragraph:

[0001] This application is a continuation of application Serial No. 10/016,697, filed November 1, 2001, ~~pending~~ now U.S. Patent 6,619,029, issued September 16, 2003.

Please replace paragraph number **[0019]** with the following rewritten paragraph:

[0019] The volume of propellant in gun-launched rocket motors is maximized when the interior diameter of the rocket motor case cylinder is maximized by making the case cylinder as thin as possible. However, the case cylinder should be designed thick enough to withstand ~~gun-~~ gun-launched loads and, when gun pressure is allowed within the case cylinder, the pressure differentials between the inside and outside of the case cylinder. The case cylinder should further be designed to withstand pressure differentials not only at maximum levels, but as the gun pressure rises early during launch and falls as the rocket motor exits the gun bore. Rocket motors designed according to the prior art must therefore survive gun launch loadings that are frequently far more severe than the later loadings during rocket motor burn. This may require thicker structures which diminish the volume available for propellant, and which increase the inert weight of the motor, thereby diminishing the attainable range or velocity of the projectile.

Please replace paragraph number **[0023]** with the following rewritten paragraph:

[0023] This invention also addresses the above advancement by providing a ~~gun-~~ gun-launched rocket motor designed to diminish the net loads that the rocket motor case experiences during gun launch, reduce the inert weight and increase the available propellant volume, and provide an insensitive munitions case and closure design.

Please replace paragraph number **[0031]** with the following rewritten paragraph:

[0031] In accordance with this third aspect of the invention, the interior ~~environment-~~ environment-controlled movable piston accommodates volume changes due to propellant

thermal expansion and accommodates the substantial gun pressures associated with gun-launched projectiles. This enables a rocket motor structure design with the ability to withstand a dramatic rapid rise and dramatic sudden fall in pressure associated with gun-launched rockets. The movable piston also permits the rocket motor to be constructed from thinner and lighter materials to increase the available propellant volume and reduce overall inert weight. As a consequence, the range and effectiveness of the rocket motor are increased. Simultaneously, the rocket motor incorporates IM capability to permit the rocket motor to be rendered relatively harmless should the solid propellant inappropriately ignite while being stored or transported.

Please replace paragraph number **[0032]** with the following rewritten paragraph:

[0032] In accordance with a fourth aspect of this invention, the rocket motor comprises a primary insensitive munitions charge and a secondary insensitive munitions charge. The secondary insensitive munitions charge is formulated to have an auto-ignition temperature below the auto-ignition temperature of the propellant grain yet higher than the auto-ignition temperature of the primary insensitive munitions. The secondary insensitive munitions charge is preferably located in close proximity to the end burn surface of the primary propellant grain, so that ~~auto-~~ auto-ignition of the secondary insensitive munitions charge in turn ignites the end burn surface of the primary propellant grain. As a consequence, the primary propellant grain will begin to burn from its end surface (where intended) before the primary propellant grain reaches its ~~auto-~~ auto-ignition temperature. Thus, a significant portion or all of the primary propellant grain will be consumed by controlled burning at its end surface prior to auto-ignition of the primary propellant grain. Also, because the secondary insensitive munitions charge is designed to auto-ignite after the primary insensitive munitions charge, the case should already have burst (i.e., vented) by the time the secondary insensitive munitions charge auto-ignites.

Please replace paragraph number **[0057]** with the following rewritten paragraph:

[0057] An insensitive munitions charge 150 is illustrated positioned in an annular recess of and contacting the tapered rubber insulator 90, with an aft surface of the insensitive

munitions charge 150 positioned flush against the forward surface 70 of the flange 60. Although shown having an annular shape, the insensitive munitions charge 150 may have other shapes and be located at other positions. For example, the insensitive munitions charge 150 may comprise a plurality of distinct charges circumferentially spaced apart from each other. Other suitable locations for the insensitive munitions charge 150 include, for example, adjacent to the extension 96. The insensitive munitions charge 150 is preferably an energetic material. Representative insensitive munitions charges 150 include, by way of example, rocket propellants, such as dihydroxyglyoxime propellants, hydroxy-terminated polyethers, and TPGE (a random 50:50 copolymer of polytetrahydrofuran and polyethyleneglycol, available from Alliant Techsystems Inc.) propellants. These examples are meant to be an illustrated list and not exhaustive of the scope of the invention. Preferably, the insensitive munitions charge 150 has an insensitive munitions auto-ignition temperature that is at least 100°F (56°C) below the ~~auto-~~ auto-ignition temperature of the primary propellant grain 26.

Please replace paragraph number **[0058]** with the following rewritten paragraph:

[0058] With reference to FIG. 3, it can be noted that an annular gap 140 is defined between the external surface 54 of the sliding piston 50 and the internal bore 36 of the aft closure member 32. During normal operation, the rocket motor 14 will be launched, preferably from a launch weapon, as discussed previously. As a result of such a gun launch, and as gun gases are generated within the bore of the gun by the gun propellant (not shown) aft of the rocket motor 14, such gun gases will enter annular gap 140 and strike against and pressurize the aft surface 68 of the flange 60. The imposing of such axial forces on the sliding piston 50 moves the sliding piston 50 from an at-rest position forward toward and ultimately to a maximum pressure position. As the sliding piston 50 is moved forward, the depth d of the cavity 142 between the aft surface 68 of the flange 60 and the forward surface 42 of the aft closure member 32 is increased. As the sliding piston 50 moves forward to increase the size of the cavity 142, the outer edge of the flange 60 slides along the inside surface of the cylindrical portion 24, guided by seal components such as rings 62, 64, and 66. The axial force on the flange 60 of the sliding

piston 50 is transmitted through the tapered rubber insulator 90, compressively loading the propellant grain 26 and causing the propellant grain 26 to deform radially to fill the void space 25. Similar type movement of a sliding piston is disclosed and illustrated in U.S. Patent No. 6,094,906 to Singer et al.

Please replace paragraph number **[0059]** with the following rewritten paragraph:

[0059] As the gun launch concludes, gun gases that entered the rocket motor 14 through the annular gap 140 will depart through that same annular gap 140 and forces acting on the aft surface 68 of the flange 60 (through cavity 142) will progressively lessen. Compressive forces previously acting on the propellant grain 26 will likewise progressively decrease, and as these forces decrease, pressures interior and exterior to the case 23 will also progressively decrease. As a consequence, the case 23 will have been able to tolerate the rise and fall of interior and exterior pressures associated with gun launching.

Please replace paragraph number **[0060]** with the following rewritten paragraph:

[0060] As forces decrease, the axial force acting to compress the tapered rubber insulator 90 also lessens, allowing the insulator 90 to return to its uncompressed condition. As the tapered rubber insulator 90 returns to its former thickness, such movement will initiate aftward movement of the sliding piston 50 toward the aft closure member 32 and separate the bond provided between the propellant grain 26 and the forward surface of the rubber sheet nozzle insulator 120. This separation provides a path for burn propagation during normal ignition that will follow. The aft surface of the rubber sheet nozzle insulator 120 remains adhered to most of the forward face of the forward nozzle insulator 102. At this point, the propellant grain 26 is ready to be ignited for a normal burn.

Please replace paragraph number **[0061]** with the following rewritten paragraph:

[0061] The gun gases initiate burn of the time delay ignition train 88 within the igniter assembly 80, so that at a desired interval after the projectile leaves the bore of the launch

weapon, an igniting flame passes from the igniter assembly 80 through inhibitor portion 122 and into contact with the propellant grain 26. When this occurs, the rubber sheet nozzle insulator 120 will be adhered to the forward surface of the forward nozzle insulator 102. With this connection, normal burning of the propellant grain 26 can proceed on the forward side of the rubber sheet nozzle insulator 120.

Please replace paragraph number **[0062]** with the following rewritten paragraph:

[0062] As the propellant grain 26 is ignited by the igniter assembly 80, the throat-barrier member 110 is eroded or otherwise substantially removed or jettisoned by activation of the igniter assembly 80 and/or burning of the propellant grain 26. Burning of the propellant grain 26 causes the sliding piston 50, together with the attached nozzle assembly 100, to slide aftward until the aft surface 68 of the flange 60 contacts the forward surface 42 of the aft closure member 32, as shown in FIG. 5. As propelling forces begin to rise, heat and pressure build within the nozzle assembly 100. Due to the frangible nature of the bond holding the igniter assembly 80 in place, such pressures will also break that bond, thereby expelling the igniter assembly 80 from the nozzle passageway. FIG. 5 illustrates the rocket motor 14 after the igniter assembly 80 has been ejected.

Please replace paragraph number **[0068]** with the following rewritten paragraph:

[0068] Another embodiment of this invention will now be discussed with reference to FIG. 7. In this embodiment, the insensitive munitions charge 150 is a primary insensitive munitions charge, and the rocket motor 14 further comprises a secondary insensitive munitions charge 200. The secondary insensitive munitions charge 200 has an auto-ignition temperature below the auto-ignition temperature of the primary propellant grain 26 yet higher than the ~~auto-~~ auto-ignition temperature of the primary insensitive munitions charge 150.

Please replace paragraph number **[0071]** with the following rewritten paragraph:

[0071] Further, because the secondary insensitive munitions charge 200 has a lower auto-ignition temperature than the primary propellant grain 26, the propellant grain 26 will be ignited at its aft surface before the total propellant grain 26 can undergo auto-ignition. As a consequence, ignition of the primary propellant grain 26 is largely isolated to a single position (or a plurality of positions) at which the secondary insensitive munitions charge 200 is located. Furthermore, the close proximity of the secondary insensitive munitions charge 200 to the aft surface of the primary propellant grain 26 causes the primary propellant grain 26 to be ignited at its aft surface, where intended. The ignition of the primary propellant ~~gain~~ grain 26 at its aft surface leads to a relatively nonviolent reaction at essentially ambient pressure and produces very low propulsive thrust and lower likelihood of propulsive fragments. Preferably, the auto-ignition temperature of the secondary insensitive munitions charge 200 is about 350°F (about 177°C). It is believed that those having ordinary skill in the art and reference to this disclosure can identify suitable secondary insensitive munitions charges 200 without undue experimentation.